

REMARKS

Favorable reconsideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-8 are pending in the present Application. Claims 1-2 and 6-8 are amended by the present amendment. Support for the amended claim can be found in the specification, claims and drawings.¹ No new matter has been added.

In the Office Action, Claims 1-8 were rejected under 35 U.S.C. § 103(a) as unpatentable over Coulson et al. (“A Statistical Basis for Lognormal Shadowing Effects in Multipath Fading Channels”, herein Coulson) in view of Zhao (“Multipath Propagation Characterization for Terrestrial Mobile and Fixed Microwave Communications,” herein Zhao I) and Zhao et al. (“Multipath Propagation Study Combining Terrain Diffraction and Reflection,” herein Zhao II).

The Office Action rejected Claims 1-8 under 35 U.S.C. § 103(a) as unpatentable over Coulson in view of Zhao I and Zhao II. The Official Action asserts that Coulson discloses all of the Applicants’ claim features with the exception of generating time-varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E_1 and E_2 that are electric field strengths of radio propagation paths diffracted by knife-edges at opposite ends of the shadowing object. The Official Action cites Zhao I as describing this more detailed aspect of the Applicants’ claimed advancements, with the exception of the “edges at opposite ends of the shadowing object,” instead relying on Zhao II for this claimed feature, and states that it would have been obvious to one of ordinary skill in the art at the time the advancements were made, to combine the cited references to arrive at Applicants’ claims. In response to this rejection, Applicants respectfully submit that

¹ E.g., specification, at least at Fig. 12 and pp. 32-33.

amended independent Claims 1-2 and 6-8 recite novel features clearly not taught or rendered obvious by the applied references.

Claim 1 recites, *inter alia*, a time-varying multi-path generating apparatus for simulating multi-path fluctuations in radio communications, having:

... time-varying amplitude functions are aligned serially in the time domain such that a time-varying shadow amplitude function is obtained, which is repeated N times, where N represents the number of the propagation paths, resulting in N time-varying shadow amplitude functions,

the time-varying phase functions are aligned serially in the time domain such that a time-varying shadow phase function is obtained, which is repeated N times, where N represents the number of the propagation paths, resulting in N time-varying shadow phase functions,

an initial amplitude, an initial phase, an initial time delay, and an initial arrival direction are generated as the propagation path parameters of a propagation path using random numbers provided by the random number generating unit based on the initial value generation parameters stored in the data storage unit, and

the time-varying shadow amplitude functions and the time-varying shadow phase functions are superimposed on the initial amplitude and the initial phase, respectively, for generating a plurality of time-varying propagation paths,

wherein, when generating the time varying propagation paths, if a shadowing object is present in the line of sight, a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges, ***each of the radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively.*** (emphasis added)

Independent Claims 2 and 6-8, while directed to alternative embodiments, are amended to recite similar features. Accordingly, the remarks and arguments presented below are applicable to each of amended independent Claims 1-2 and 6-8.

As admitted at pp. 4-5 of the Office Action, the combination of Coulson and Zhao I fails to disclose that a received electric field strength E is given as the summation of E1 and E2 that are electric field strengths of radio propagation paths diffracted by knife-edges “at opposite ends of the shadowing object.” Therefore, it follows that the combination of Coulson and Zhao I fail to disclose that “***each of the radio propagation paths [are]***

diffracted at each of opposite ends of the shadowing object, respectively,” as recited in amended independent Claim 1.

In an attempt to remedy the above noted deficiency, the Office Action relies on pp. 1204-1205 and Figs. 2a/2b of Zhao II, asserting that this reference “discloses edges at the opposite ends of the shadowing object.”

Zhao II describes a method for deriving a multiple knife-edge attenuation formula by combining diffraction and ground reflection. As described in section III on p. 1205 with reference to Figs. 2a/b, for example, Zhao II describes that each of the knife edges are defined as the mean diffraction at one end of a first shadowing object and at a second end of a second shadowing object, and so on.

Therefore, the knife edges, as defined in Zhao II each represent only a single diffraction at one point of a shadowing object, and not diffraction at ***each of opposite ends of a shadowing object***, as claimed. Thus Zhao II fails to teach or suggest “that a received electric field strength E is given as the summation of E_1 and E_2 that are electric field strengths of radio propagation paths diffracted by knife-edges, ***each of the radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively,***” as recited in amended independent Claim 1.

As disclosed in an exemplary embodiment at Fig. 12, and as described at pp. 32-33 of the specification, the knife-edges 1, 2, are each defined as being on opposite ends of a single shadowing object. Zhao II, on the other hand, does not teach or suggest taking into account shadowing at both ends of a shadowing object, but instead merely describes that a single diffraction point, or knife-edge, is defined at an end of each a plurality of shadowing objects.

Therefore, Coulson, Zhao I and Zhao II, neither alone, nor in combination, teach or suggest that “a received electric field strength E is given as the summation of E_1 and E_2 that are electric field strengths of radio propagation paths diffracted by knife-edges, ***each of the***

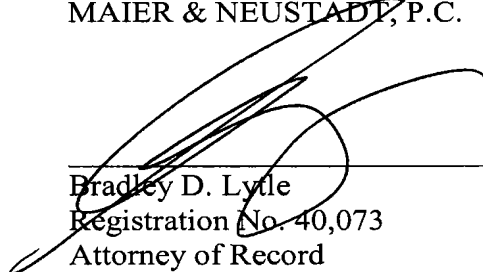
radio propagation paths being diffracted at each of opposite ends of the shadowing object, respectively,” as recited in independent Claims 1-2 and 6-8.

Accordingly, Applicants respectfully request the rejection of Claims 1-8 under 35 U.S.C. § 103 be withdrawn.

Consequently, in view of the foregoing amendment and remarks, it is respectfully submitted that the present application, including Claims 1-8, is patentably distinguishing over the prior art, in condition for allowance, and such action is respectfully requested at an early date.

Respectfully submitted,

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